CELL SIGNALING ASSAY KITS

ARBOR ASSAYS
Interactive Assay Solutions™

CELL
SIGNALING

Table of Contents & Ordering

DetectX® Assay Kits	Page
2′,3′-Cyclic GAMP ELISA Kits	3
2′,3′-Cyclic GAMP STING-Based FRET Detection Kits	4
3′,3′-Cyclic GAMP ELISA Kits	5
Alkaline Phosphatase Colorimetric Activity Kit	6
Adrenocorticotropic Hormone (ACTH) ELISA Kits	7
Cyclic AMP Direct ELISA & Chemiluminescent ELISA Kits	8
Cyclic GMP Direct ELISA & Chemiluminescent ELISA Kits	9
Cyclic GMP Direct ELISA Kits - Improved Sensitivity	10
Comparison of cGMP ELISA Kits (K065-H vs. K020-H)	11
Endothelin-1 (ET-1) ELISA Kit	12
Nitric Oxide (NO) Detection Kit	13
Prostaglandin E_2 (PGE_2) Multi-Format ELISA Kits	14
Protein Kinase A (PKA) Activity Kit	15
Inhibitors and Activators	16

Ordering

ONLINE:
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2′,3′-Cyclic GAMP ELISA Kits

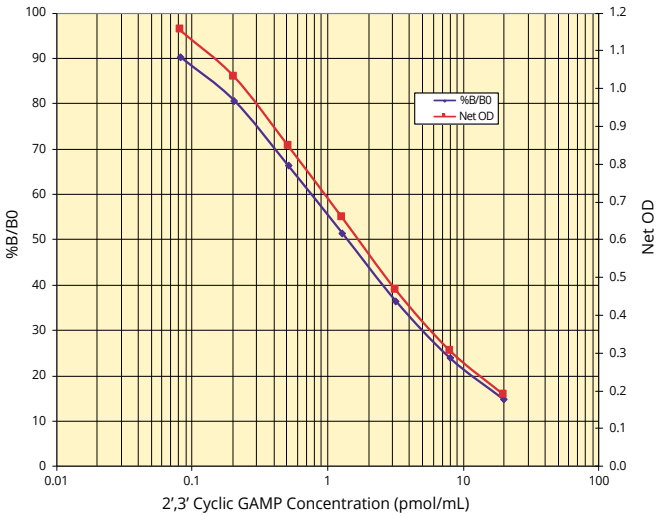
K067-H1 (1 Strip-Well Plate) | K067-H5 (5 Strip-Well Plate)
K067-H1W (1 Whole Plate) | K067-H5W (5 Whole Plate)
K067-H1D (384-Well Plate)

FEATURES

- Use — Measure 2′,3′-cGAMP in tissues and cells
- Sample — Cell Lysates, Tissue Extracts, TCM
- Sensitivity — 0.04 pmol/mL, 2 fmol/well
- Samples/Kit — 96-well: 39 or 231 in Duplicate
  384-well: 183 in Duplicate
- Stability — Liquid 4°C Stable Reagents
- Readout — Colorimetric, 450 nm

SCIENTIFIC RELEVANCE

2′,3′-Cyclic guanosine monophosphate–adenosine monophosphate (cyclic GMP-AMP, cGAMP, cyclic [G(2′,5′) pA(3′,5′)p]) is referred to as “noncanonical“ cGAMP due to the presence of the atypical 2′-5′ phosphodiester linkage between the guanosine and the adenosine. 2′,3′-Cyclic GAMP is a novel second messenger in innate immunity that regulates type I interferon (IFN) production. Produced in mammalian cells by cGAS (cGAMP synthase) in response to double-stranded DNA in the cytoplasm binding to cGAS, cGAMP binds to the stimulator of interferon genes (STING). Subsequently STING induces the TBK1-IRF3-dependent production of IFN-β. This cGAS-cGAMP-STING pathway has been shown to play a critical role in pathogen detection and physiological conditions such as metabolic dysregulation, autoimmunity, and cancer.



2′,3′-Cyclic GAMP STING-Based FRET Detection Kits

K081-F1 (1 Plate) | K081-H5 (5 Plate)

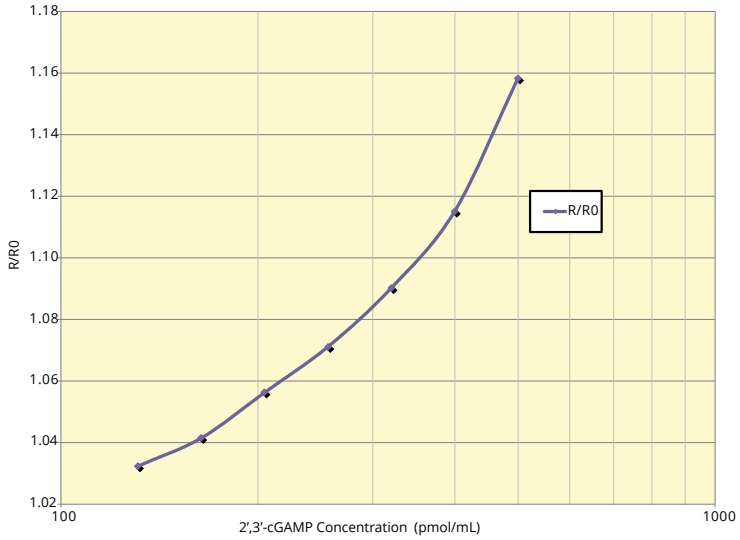
FEATURES

MULTI SPECIES

- Use: Detection of 2′,3′-cGAMP
- Sample: Cell Lysates, Tissue Extracts, TCM
- Sensitivity: 82.02 pmol/mL
- Standard Range: 500 - 131 nM
- Samples/Kit: 40 or 232 in Duplicate
- Readout: Fluorescence: Excitation 458 nm, Emission: 600 nm/490 nm

SCIENTIFIC RELEVANCE

The assay uses a biosensor (BioSTING), a fluorescence resonance energy transfer (FRET) based sensor based on STING, designed specifically to detect 2′,3′-cGAMP in real-time within living cells. FRET is a fluorescence detection platform based on a distance-dependent relationship between two fluorophores. In the case of BioSTING, mTFP and mKO2 are the fluorophores of choice. When mTFP is excited with a wavelength of 458 nm, the emission is detected at 490 nm when no ligand (2′,3′-cGAMP) is present. When BioSTING binds to the ligand, the two fluorophores are positioned in closer proximity to each other, allowing the fluorescence to be transferred from mTFP to mKO2, changing the emission wavelength to 600 nm. Using this detection method, BioSTING shows applicability for in vitro high-throughput screening for cylic di-nucleotide production modulation and direct screening for STING agonists and antagonists.



3′,3′-Cyclic GAMP ELISA Kits

K073-H1 (1 Plate) | K073-H5 (5 Plate)

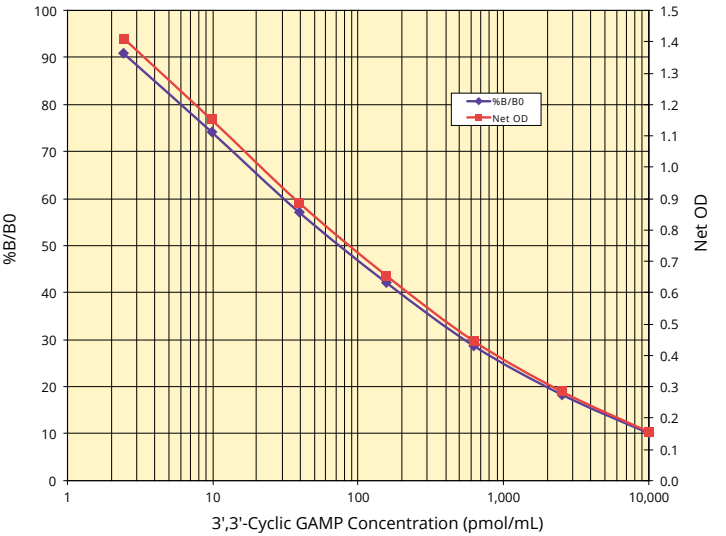
FEATURES

- Use — Measure 3′,3′-cGAMP in tissues and cells
- Sample — Cell Lysates, Tissue Extracts, TCM
- Sensitivity — 0.944 pmol/mL, 47 fmol/well
- Samples/Kit — 39 or 231 in Duplicate
- Stability — Liquid 4°C Stable Reagents
- Readout — Colorimetric, 450 nm

MULTI SPECIES

MOST SENSITIVE

SCIENTIFIC RELEVANCE



3′,3′-cyclic GAMP (cyclic [G(3′,5′)pA(3′,5′)p], previously known as cGAMP) is a key mediator of bacterial signal transduction and regulation, controlling a range of diverse targets including transcription, enzyme activity and cell cycle progression. 3′,3′-cGAMP signaling in bacteria is regulated in-part by gene regulatory RNA elements called riboswitches that bind and respond to cGAMP with high affinity and specificity. The 3′,3′-cGAMP riboswitches regulate genes involved in motility, biofilm formation, colonization, and virulence. The cyclic nucleotides have emerged as key players involved in bacterial physiology and inhibition studies of cGAMP signaling are ongoing as an anti-microbial strategy. In mammalian cells, 3′,3′-cGAMP and its eukaryotic analog 2′,3′-cGAMP produced by cGAS, bind STING (stimulator of IFN genes) and subsequently induce TBK1-IRF3-dependent production of IFN-β. Here, the cGAS-cGAMP-STING DNA sensing pathway is a key activator of the innate immune response to foreign or harmful native DNA. The cGAS-cGAMP-STING pathway plays a critical role in antiviral and antitumor immunity as well as mediating autoimmune responses. Dysregulation or aberrant activation of the pathway by self-DNA has emerged as an underlying cause of tumorigenesis and autoimmune disorders.

Adrenocorticotropic Hormone (ACTH) ELISA Kits

K072-H1 (1 Plate) | K072-H5 (5 Plate)

FEATURES

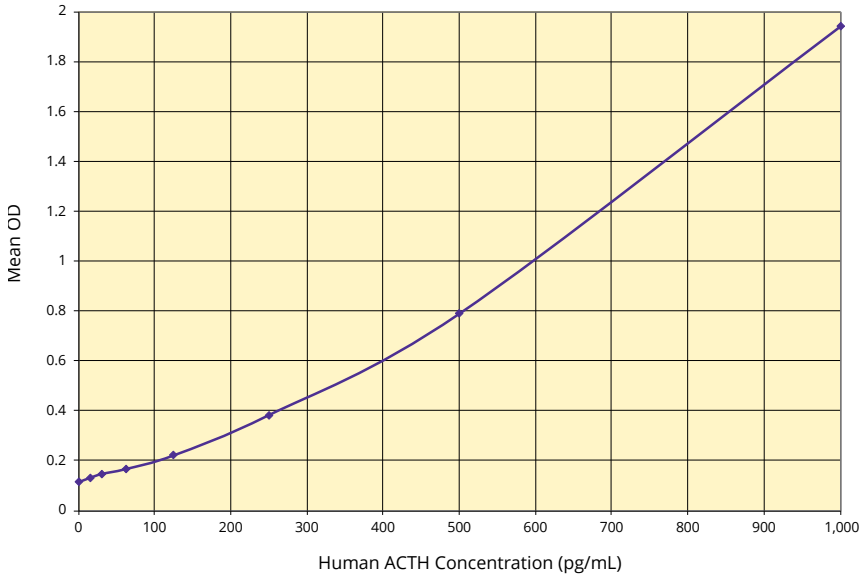
- Use — Measure ACTH in plasma samples
- Sample — Plasma
- Sensitivity — 12.71 pg/mL
- Samples/Kit — 40 or 232 in Duplicate
- Stability — Liquid 4°C Stable Reagents
- Readout — Colorimetric, 450 nm

MULTI SPECIES

MOST SENSITIVE

SCIENTIFIC RELEVANCE

Adrenocorticotropic hormone (ACTH, also adrenocorticotropin, corticotropin) is an important component of the hypothalamic-pituitary-adrenal (HPA) axis and is produced in response to biological stress. Its principal effects are increased production and release of glucocorticoids (GCs). Stress-induced secretion of the peptide hormone corticotropin-releasing hormone (CRH) stimulates pituitary ACTH secretion. Circulating ACTH binds to melanocortin receptors on the surface of adrenal zona cells, inducing the synthesis and release of all adrenal steroids, aldosterone, GCs and adrenal androgens. ACTH is also the principal modulator of cortisol and corticosterone. In addition to the stress response, ACTH synthesis is related to the circadian rhythm in many organisms. Measurement of plasma ACTH is helpful in the differential diagnosis of pituitary Cushing's disease, Addison's disease, adrenal tumors, adrenal hyperplasia, and ectopic ACTH syndrome.



Alkaline Phosphatase Colorimetric Activity Kit

K082-H1 (1 Plate)

FEATURES

MULTI SPECIES

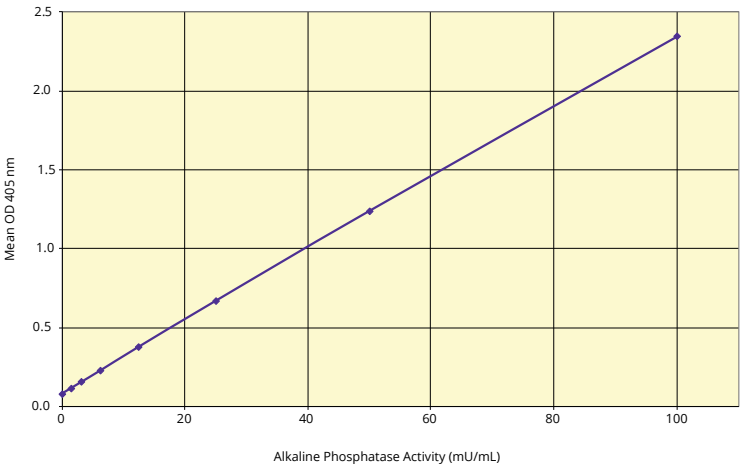
- Use: Measure Alkaline Phosphatase in a variety of samples
- Sample: Serum, non-EDTA plasma, and other biological samples
- Time to answer: 30 minutes end-point assay
- Standard Range: 1.563 – 100 mU/mL
- Samples/Kit: Up to 88 samples in duplicate
- Sensitivity: 0.06 mU/mL
- Stability: 4˚C liquid reagents
- Readout: Colorimetric, 405 nm

SCIENTIFIC RELEVANCE

Found in many higher organisms, Alkaline Phosphatase (ALP) plays an active role in regulating many biological processes, ranging from metabolism, signal transduction, molecule transportation, and the expression of genetic information. The measurement of ALP activity aids in the study of physiological conditions, disease states, mostly involving the skeletal system and liver, and the structure-activity relationships in inhibitor research.

The DetectX® Alkaline Phosphatase Colorimetric Activity Kit is designed to quantitatively measure ALP activity in a variety of biological samples. The assay is formulated to measure ALP activity in physiologically relevant samples and includes a calibrated ALP standard.

Assay Kit developed by 21 Grams Assays, Inc., www.21gramsassays.com.



Cyclic AMP Direct ELISA & Chemiluminescent ELISA Kits

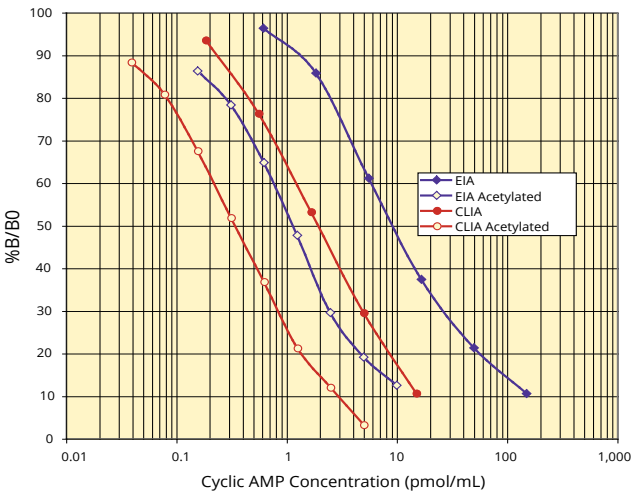
ELISA: K019-H1 (1 Plate) | K019-H5 (5 Plate)
Chemiluminescent ELISA: K019-C1 (1 Plate) | K019-C5 (5 Plate)

FEATURES

▶ Use	Measure cAMP **Directly**
▶ Sample	Cells, Saliva, Urine, Plasma ,Tissue
▶ Convenient	Lyse, Stabilize and Measure in One Step
▶ Sensitivity	ELISA: 4.2 fmol /well CLIA: 0.75 fmol/well
▶ Samples/Kit	ELISA: 39 or 231 in Duplicate CLIA: 38 or 230 in Duplicate
▶ Time to Answer	ELISA: 2.5 Hours CLIA: 2 Hours
▶ Readout	ELISA: Colorimetric, 450 nm CLIA: Glow Luminescent

SCIENTIFIC RELEVANCE

Adenosine-3', 5'-cyclic monophosphate, or cyclic AMP (cAMP), is one of the most important second messengers and a key intracellular regulator. It was discovered by Sutherland and Rall in 1957. Cyclic AMP functions as a mediator of activity for a number of hormones, including epinephrine, glucagon, and ACTH. Adenylate cyclase is activated by the hormones glucagon and adrenaline, and by G protein. Liver adenylate cyclase responds more strongly to glucagon and muscle adenylate cyclase responds more strongly to adrenaline. cAMP decomposition into AMP is catalyzed by the enzyme phosphodiesterase. The Human Metabolome Database lists 166 metabolic enzymes that convert cAMP.



Cyclic GMP Direct ELISA & Chemiluminescent ELISA Kits

ELISA: K020-H1 (1 Plate) | K020-H5 (5 Plate)
Chemiluminescent ELISA: K020-C1 (1 Plate) | K020-C5 (5 Plate)

MULTI SPECIES

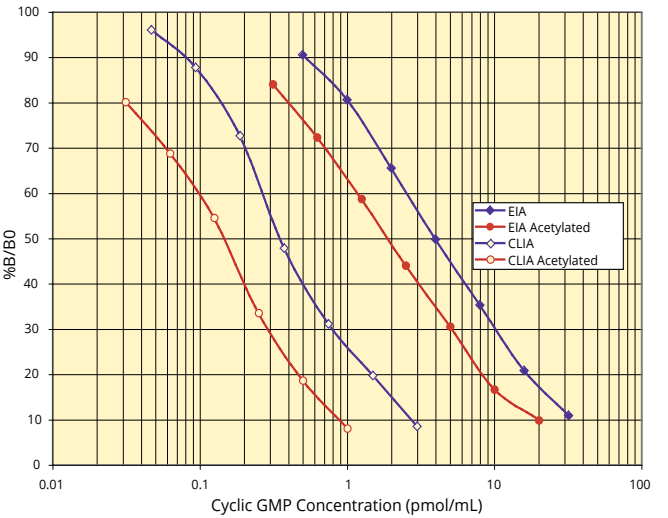
MOST SENSITIVE

FEATURES

Use	Measure cGMP Directly
Sample	Cells, Saliva, Urine, Plasma, TCM
Convenient	Lyse, Stabilize and Measure in One Step
Sensitivity	ELISA: 0.188 pmol/mL CLIA: 1.15 fmol/well
Samples/Kit	39 or 231 in Duplicate
Species	Species Independent
Stability	Liquid 4°C Stable Reagents
Readout	ELISA: Colorimetric, 450 nm CLIA: Glow Luminescent

SCIENTIFIC RELEVANCE

Guanosine 3', 5'-cyclic monophosphate (cyclic GMP; cGMP) is a critical and multifunctional second messenger present at levels typically 10-100 fold lower than cAMP in most tissues. Intracellular cGMP is formed by the action of the enzyme guanylate cyclase (GC) on GTP and degraded through phosphodiesterase hydrolysis. Guanylate cyclases are either soluble or membrane bound. Soluble GCs are nitric oxide responsive, whereas membrane bound GCs respond to hormones such as acetylcholine, insulin and oxytocin. Other chemicals like serotonin and histamine also cause an increase in cGMP levels. Cyclic GMP regulates cellular composition through cGMP-dependent kinase, cGMP-dependent ion channels or transporters, and through its hydrolytic degradation by phosphodiesterase.



Cyclic GMP Direct ELISA Kits - Improved

K065-H1 (1 Plate) | K065-H5 (5 Plate)

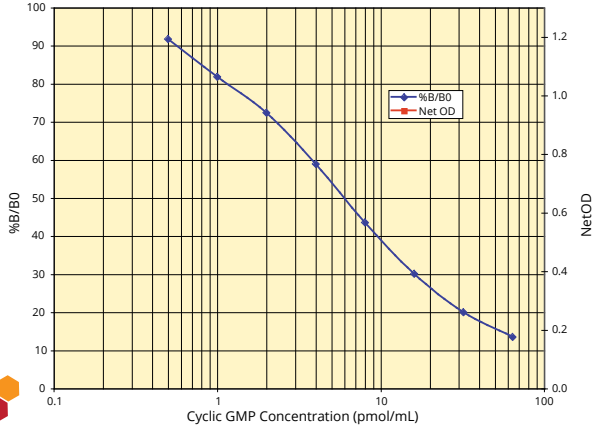
FEATURES

Use	Measure cGMP Directly
Sample	Cell and Tissue Lysates, Urine, Plasma, Saliva, TCM
Convenient	Lyse, Stabilize and Measure in One Step
Sensitivity	0.091 pmol/mL, 4.55 fmol/well
Samples/Kit	38 or 230 in Duplicate
Time to Answer	Results in 2.5 Hours
Readout	Colorimetric, 450 nm
Comparison	Improved Sensitivity and Enhanced Signal over K020-H

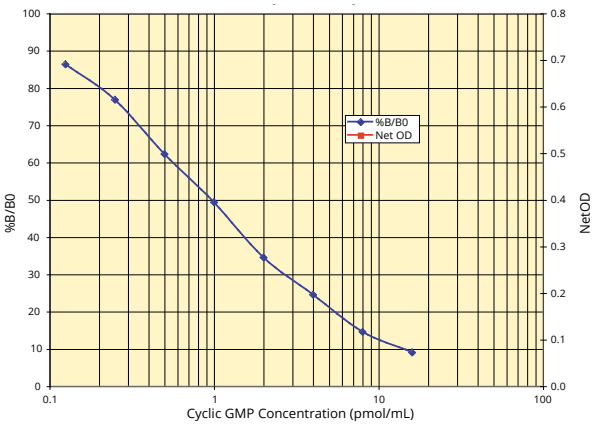
SCIENTIFIC RELEVANCE

Guanosine 3', 5'-cyclic monophosphate (cyclic GMP; cGMP) is a critical and multifunctional second messenger present at levels typically 10-100 fold lower than cAMP in most tissues. Intracellular cGMP is formed by the action of the enzyme guanylate cyclase (GC) on GTP and degraded through phosphodiesterase hydrolysis. Guanylate cyclases are either soluble or membrane bound. Soluble GCs are nitric oxide responsive, whereas membrane bound GCs respond to hormones such as acetylcholine, insulin and oxytocin. Other chemicals like serotonin and histamine also cause an increase in cGMP levels. Cyclic GMP regulates cellular composition through cGMP-dependent kinase, cGMP-dependent ion channels or transporters, and through its hydrolytic degradation by phosphodiesterase.

Non-Acetylated



Acetylated



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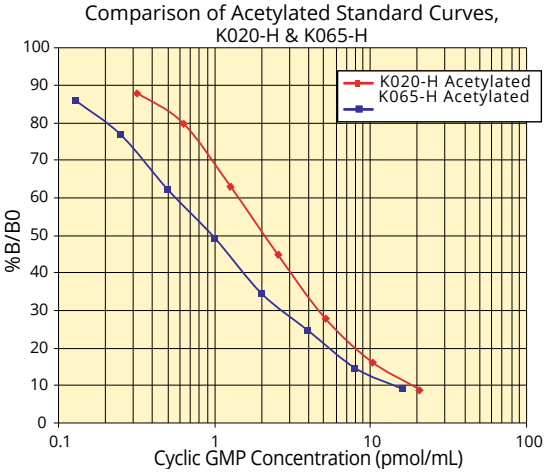
Comparison of cGMP ELISA Kits (K065-H vs. K020-H)

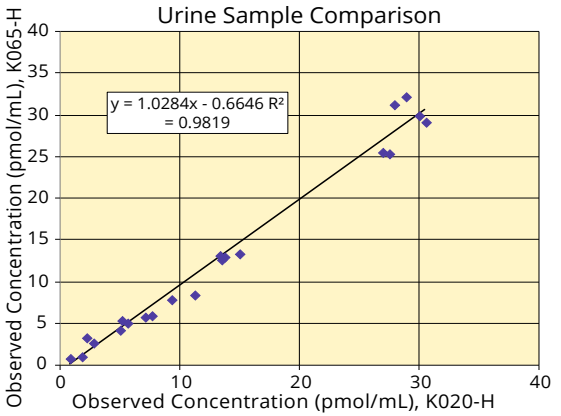
ADDITIONAL INFORMATION

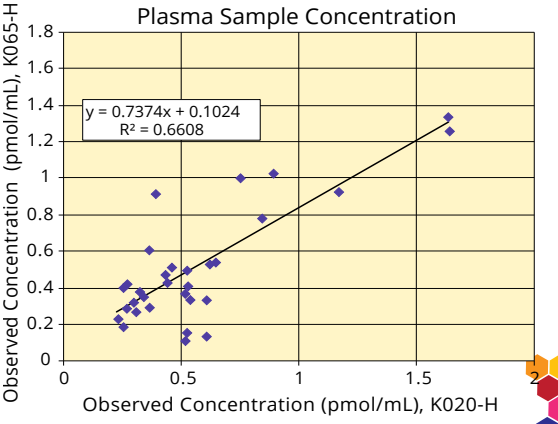
Cyclic GMP levels in most systems are an order of magnitude lower than those found for cyclic AMP and in our constant effort to deliver the easiest, most reliable and sensitive assays we have developed a new cGMP antibody to give you enhanced sensitivity. Our new Cyclic GMP ELISA Kits (K065-H) are 2-fold more sensitive than our current cGMP assay (K020-H).



The improvement in sensitivity is shown by the Limits of Detection and calculated Sensitivity for the 2 assays, with K065-H being half that of K020-H.

Urine dilutions were run in the nonacetylated format of K065-H and K020-H, side by side, and measured cGMP concentrations were similar. Plasma dilutions were run in the acetylated format for each kit with only a slightly larger difference seen between the measured concentrations.





Endothelin-1 (ET-1) ELISA Kit

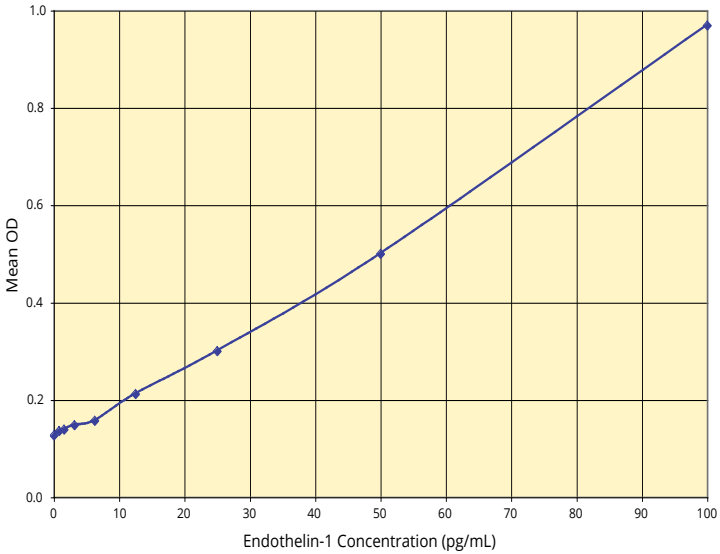
K045-H1 (1 Plate)

FEATURES

Use	Simplified ET-1 Measurement
Sample	Serum, Plasma, TCM
Sensitivity	Measures < 0.58 pg/mL ET-1
Economical	No C18 Cartridges - Supplied Extraction Solution
Species	Species Independent
Samples/Kit	39 in Duplicate
Stability	Liquid 4°C Stable Reagents
Readout	Colorimetric, 450 nm

SCIENTIFIC RELEVANCE

Endothelin-1 (ET-1), a peptide of 21 amino acid residues, is a pleiotropic molecule known for its action as a potent vasoconstrictor. ET-1 is one of a family of three proteins encoded by distinct genes. All members of the Endothelin family contain two essential disulfide bridges and six conserved amino acid residues at the C-terminus. Human ET-1 is initially synthesized as a pre-pro-polypeptide of 212 amino acids. It is proteolytically cleaved by a signal peptidase to produce pro-ET-1 and further processed by a Furin-like protease to yield Big ET-1. The vascular endothelium is an abundant source of ET-1. It may also be expressed by leukocytes, smooth muscle cells, mesangial cells, cardiac myocytes, and astrocytes. ET-1 can be induced in endothelial cells by many factors including mechanical stimulation, various hormones, and pro-inflammatory cytokines. Production is inhibited by nitric oxide (NO), cyclic nucleotides, prostacyclin, and atrial natriuretic peptide (ANP).



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Nitric Oxide Colorimetric Detection Kit

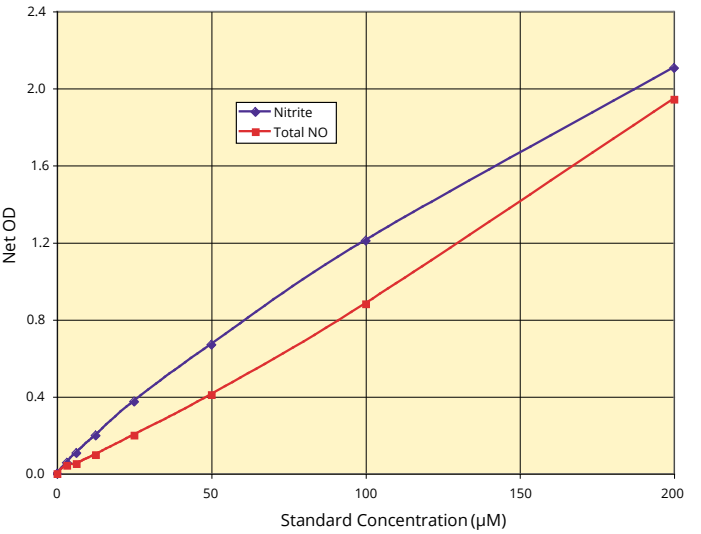
K023-H1 (2 Plate)

FEATURES

Use	Measure Nitrite & Nitrate
Sample	Water, Serum, Plasma, Urine, Saliva, Lysates, Buffers, TCM
Accurate	Calibrated to NIST Standard Reference Material #3185
Sensitivity	Highest Optical Density of Any Kit
Time to Answer	5 Minute Nitrite – 25 Minute Total NO
Samples/Kit	88 in Duplicate
Stability	Non-Toxic, Liquid 4°C Stable Reagents
Readout	Colorimetric, 550-570 nm

SCIENTIFIC RELEVANCE

Nitric oxide (NO) is a diffusible, transient, reactive molecule that has physiological effects in the pM-µM range. Acting through guanylate cyclase activation, NO is an important regulator of the cardiovascular, nervous, and immunological systems. NO is bio-available by two routes. It can be endogenously generated by constitutive or induced NOS enzymes, or it can be ingested as nitrates or nitrites for conversion into NO. The reactive nature of nitric oxide allows it to act as a cytotoxic factor when released during an immune response by macrophages. The reactivity also allows NO to be easily converted to a toxic radical that can produce nitrosylation damage to cells and DNA. Nitrosylation can be a regulated post-translational modification in cell signaling. The dynamics of the regulatory/damage facets of NO are major forces in mitochondrial signaling and dysfunction. NO is linked not only to coronary heart disease, endothelial dysfunctions, erectile dysfunction, and neurological disorders, but also diabetes, chronic periodontitis, autism and cancer.



Prostaglandin E2 (PGE2) Multi-Format ELISA Kits

K051-H1 (1 Strip-Well Plate) | K051-H5 (5 Strip-Well Plate)
K051-H1W (1 Whole Plate) | K051-H5W (5 Whole Plate)

FEATURES

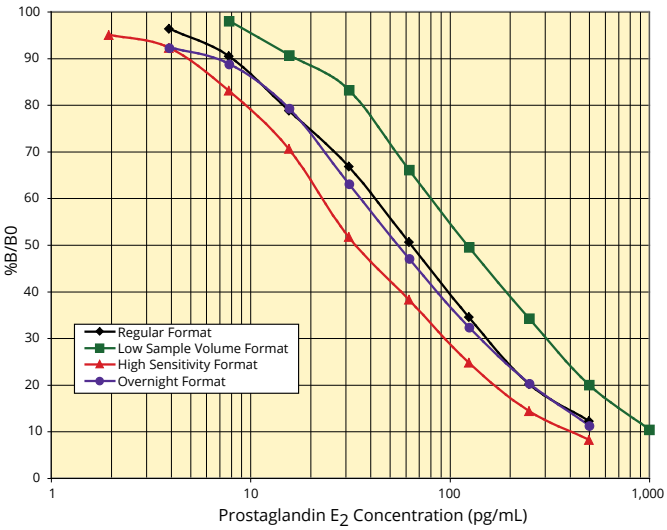
MULTI SPECIES

MOST SENSITIVE

- Use — Measure in Cells, Saliva, Urine, Serum, Plasma, Tissue
- Multi-Format — 3 Ranges: 1,000-15.6; 500-39 or 500-1.95 pg/mL
- Sensitive — < 160 fg PGE_2 per well
- Samples/Kit — 39 or 231 in Duplicate
- Workflow — Can be run in 2.5 hours or Overnight
- Versatile — Measure PGE_2 in Mouse Serum without Extraction
- Readout — Colorimetric, 450 nm

SCIENTIFIC RELEVANCE

Eicosanoid signal transduction pathways are highly conserved and are involved in a number of physiological processes. Prostaglandins are synthesized from arachidonic acid by cyclooxygenase (COX)-1 or -2, which convert the acid into PGH_2. This is further processed by cytosolic or microsomal prostaglandin synthases to become PGE_2 or one of several other prostanoids. Prostacyclin is the major cyclooxygenase product in blood vessel walls and it is present in inflammatory fluids in similar concentrations to PGE_2. PGE_2 is produced by a wide variety of tissues and in several pathological conditions, including inflammation, arthritis, fever, tissue injury, endometriosis, and a variety of cancers. Other biological actions of PGE_2 include vasodilation, modulation of sleep/wake cycles, and facilitation of human immunodeficiency virus replication. It elevates cAMP levels, stimulates bone resorption, sodium excretion and renal hemodynamics, and has thermoregulatory effects.



Protein Kinase A (PKA) Colorimetric Activity Kit

K027-H1 (1 Plate)

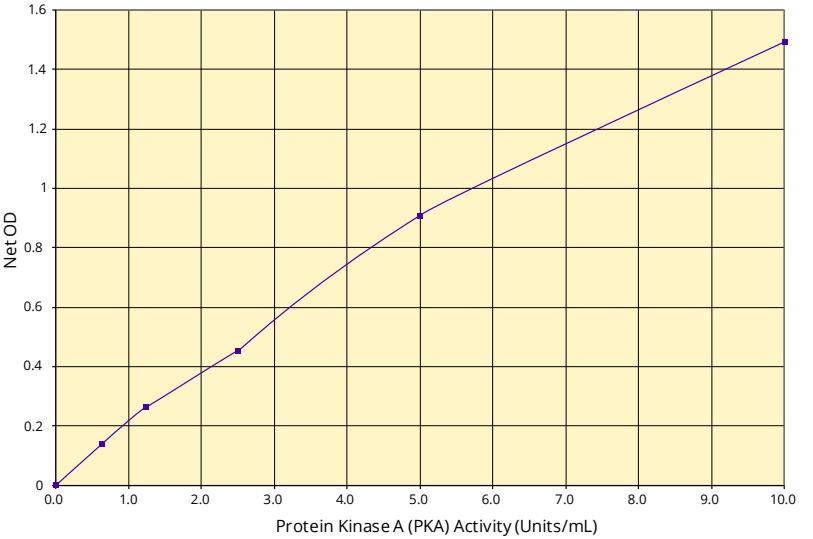
FEATURES

MOST SENSITIVE

Use	Quantitate PKA Activity
Sample	Cell Lysates, Purified Systems
Sensitive	Most Sensitive Kit
Time to Answer	3 Hours
Species	Species Independent
Samples/Kit	42 in Duplicate
Stability	Fully Active PKA Standard, Storage at -20°C
Readout	Colorimetric, 450 nm

SCIENTIFIC RELEVANCE

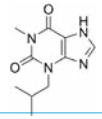
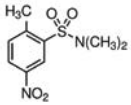
The expressed PKA holoenzyme, comprising of two catalytic (C) and two regulatory (R) subunits, is activated when cAMP levels rise following stimulation of G Protein-coupled receptors and adenylyl cyclase. The phosphorylation of specific substrates by the C subunit of activated PKA is regulated by the subcellular localization of the enzyme through the binding to the scaffolding A kinase-anchoring proteins (AKAPs). In its inactive state, the pseudosubstrate sequences on the R subunits stop the activity of the C subunits. Upon binding of cAMP to the R subunits, the active monomeric C subunits are released.



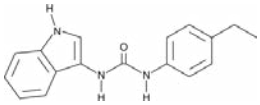
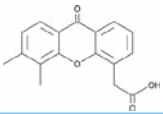
PKA shares substrate specificity with Akt (PKB) and PKC. Substrates that are phosphorylated by PKA include Bad (Ser^{155}), CREB (Ser^{133}), and GSK-3 (GSK-3α Ser^{21} and GSK -3β Ser^{9}). PKA is a pivotal kinase involved in cancer, vasodilation, metabolic processes, etc.

Enzyme Inhibitors and Activators

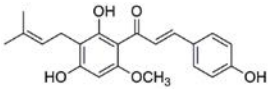
PHOSPHODIESTERASE INHIBITOR

IBMX	Pan-specific inhibitor of PDEs	100 mg & 1G	P019-100MG/1G	
BRL-50481	Specific inhibitor of PDE7	10 & 50 mg	P020-10/50MG	

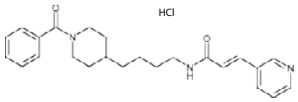
STING INHIBITORS

H-151	Irreversible STING inhibitor	10 & 50 mg	P023-10/50MG	
DMXAA	STING inhibitor	5 & 25 mg	P024-5/25MG	

CANCER CHEMOPROTECTANT

Xanthohumol	Inhibits the function of VCP	10 & 50 mg	P021-10/50MG	

NAD BIOSYNTHESIS INHIBITOR

FK-866, HCl	Specific inhibitor of NAMPT	5 & 25 mg	P006-5/25MG	

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